

**IN THE UNITED STATES PATENT AND TRADEMARK OFFICE**

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In re application of:

Hisakazu KATSUKI *et al.*

Application No. 10/588,609

TITLE: ED-71 PREPARATION

Examiner: Sabiha Naim Qazi

Art Unit: 1612

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**APPEAL BRIEF**

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The present appeal is taken from the Action of the Examiner mailed December 29, 2009, in finally rejecting claims 10, 12-14, 17 and 18. Furthermore, claims 10, 12-14 and 17-19 stand rejected in the Advisory Action mailed April 2, 2010.

A clean copy of these claims, double-spaced, appears in the Appendix to this Brief.

**REAL PARTY IN INTEREST**

The real party in interest is Chugai Seiyaku Kabushiki Kaisha, Kita-Ku, Tokyo, Japan.

In re Application No. 10/588,609

**RELATED APPEALS AND INTERFERENCES**

Undersigned is aware of no related Appeals or Interferences.

## **STATUS OF CLAIMS**

Claims 1-9, 11, 15 and 16 have been cancelled.

Claims 10, 12-14, 17 and 18 stand rejected in the Final Office Action mailed December 29, 2009. Claims 10, 12-1 and 17-19 stand rejected in the Advisory Action mailed April 2, 2010. It is therefore not clear if claim 19 is under consideration.

The rejections of claims 10, 12-14, 17, 18 and 19 are being appealed.

## **STATUS OF AMENDMENTS**

The amendment filed March 25, 2010, was deemed not to place the application into condition for allowance. The Examiner did not indicate if the amendment would be entered for purposes of appeal, and it is noted that in the Advisory Action mailed April 2, 2010, that newly submitted claim 19 was deemed to be rejected.

## SUMMARY OF CLAIMED SUBJECT MATTER

ED-71, (5Z,7E)-(1R,2R,3R)-2-(3-hydroxypropoxy)-9,10- secocholesta-5,7,10(19)-triene-1,3,25-triol, is a synthetic derivative of active Vitamin D that is a therapeutic drug for osteoporosis. The main degradation products of ED-71 are 6E-(1R,2R,3R)-2-(3-hydroxypropoxy)-9,10- secocholesta-5 (10),6,8,9(1)-triene-1,3,25-triol, hereinafter referred to as the “tachysterol form” of ED-71. and a trans form of ED-71, (5E,7E)-(1R,2R,3R)-2-(3-hydroxypropoxy)-9,10- secocholesta-5,7,10(19)-triene-1,3,25-triol. (specification page 3, line 4 to page 4, line 6)

Claims 10 and 19 are drawn to compositions comprising a standard degradation product for analyzing a sample containing ED-71, which composition contains (5E,7E)-(1R,2R,3R)-2-(3-hydroxypropoxy)-9,10-secocholesta-5,7,10(19)-triene-1,3,25-triol, the trans form of ED-71. The specification at page 6, lines 13-14, states that the trans form of ED-71 can be used as a standard in the analysis of an ED-71 preparation.

Degeneration of an oily preparation containing ED-71 can be inhibited by adding an antioxidant, particularly dl- $\alpha$ -tocopherol. (specification page 4, lines 7-10)

Claim 12 is drawn to a method of suppressing the generation of degradation products in a preparation containing Ed-71 by adding dl- $\alpha$ -tocopherol to the preparation (specification page 5, lines 16-17 and page 8, last line to page 9, line 4).

Claim 17 is drawn to trans-ED-71 for synthesizing vitamin D compound, and claim 128 is drawn to a method for synthesizing vitamin D compounds using as an intermediate trans-ED-71 (specification page 6, lines 13-15 and page 36, last paragraph).

A composition containing a standard degradation product of ED-71, (5E,7E)-(1R,2R,3R)-2-(3-hydroxypropoxy)-9,10- secocholesta-5,7,10(19)-triene-1,3,25-triol can be used to detect degradation products of ED-71 (page 9, penultimate line to page 10, line 3). The amount of (5E,7E)-(1R,2R,3R)-2-(3-hydroxypropoxy)-9,10- secocholesta-5,7,10(19)-triene-1,3,25-triol produced after 12 months of storage was suppressed to 1% or less (Table 4, page 28).

Vitamin D compounds can be synthesized from (5E,7E)-(1R,2R,3R)-2-(3-hydroxypropoxy)-9,10- secocholesta-5,7,10(19)-triene-1,3,25-triol (specification page 6,



Claim 18 is drawn to a method for synthesizing a vitamin D compound, *i.e.*, a vitamin D derivative, in which the intermediate compound is (5E,7E)-(1R,2R,3R)-2-(3-hydroxypropoxy)-9,10-secocholesta-5,7,10(19)-triene-1,3,25-triol. Paragraph [0095] states that the trans form of ED-71, namely, (5E,7E)-(1R,2R,3R)-2-(3-hydroxypropoxy)-9,10-secocholesta-5,7,10(19)-triene-1,3,25-triol, is useful as a material for synthesizing various types of vitamin D-based compounds.

**GROUND OF REJECTION TO BE REVIEWED ON APPEAL**

1. Claims 12, 13 and 18 have been rejected under 35 U.S.C. §112, first paragraph, as allegedly failing to comply with the written description requirement. The Examiner alleges that there is no description of guidance for suppressing the “generation” in the specification; there is no description of “under shading;” and claim 18 is deemed to be new matter.
2. Claims 12 and 13 have been rejected under 35 U.S.C. §112, second paragraph, as allegedly being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention. The Examiner questions the meaning of “generation”, “shading”, and “improvement.”
3. Claims 10, 14, 17 and 18 have been rejected under 35 U.S.C. §102(b) as allegedly being anticipated by Yamauchi, U.S. Patent No. 6,448,421.
4. Claims 10, 14, 17 and 18 have been rejected under 35 U.S.C. §102(b) as allegedly anticipated by Miyamoto, *Chem. Pharm. Bull.*, and Miyamoto *et al.*, US 4,666,634.
5. Claims 10, 12-14, 17 and 18 have been rejected under 35 U.S.C. §103(a) as allegedly being unpatentable over Yamauchi, Miyamoto '634 and Miyamoto, *Chem. Pharm. Bull.*, and Chen, WO 03/047595.

## ARGUMENT

### I. Claims 12, 13 and 18 comply with the written description requirement.

During a personal interview between the undersigned and Examiner Qazi March 23, 2010, it was agreed that “generation” meant “formation”, and substituting “formation” for “generation” would overcome the rejection under 35 U.S.C. §112, first and second paragraphs. It was also agreed during the interview that “shading” means “in the absence of light.”

Suppressing the generation is described at page 2, last paragraph, as follows:

Therefore, to produce ED-71 preparations, it is also important in practice to not only enhance the storage stability of ED-71 serving as an active ingredient, but also to suppress the generation of main degradation products.

That is, one feature of the invention relates to suppressing the formation of degradation products, in particular, the formation of trans ED-71 and the tachy form of ED-71.

The specification mentions “under shading” a number of times, and specifically in Tables 2 and 3 on page 27. In these tables, vials of soft capsules containing ED-71 were stored under 30°C 60% RH and [under] shading. That is, the vials were stored away from light, i.e., shaded. There is no specific requirement for temperature.

The Examiner alleges that there is no method for “improvement” in the disclosure. It is respectfully submitted that claim 18 is in standard Jepson form, that is, in United States Patent Law, a Jepson claim is a method or product claim where one or more limitations are specifically identified as a point of novelty, distinguishable over at least the contents of the preamble. They may read, for instance, “A system for storing information having (...) *wherein the improvement comprises: ...*”. The claim is named after the case, *Ex parte Jepson*<sup>1</sup>, decided in 1917. Jepson format is described in MPEP §608(m).

In a crowded art, a Jepson claim can be useful in calling the examiner's attention to a point of novelty of an invention without requiring the applicant to present arguments and possibly amendments to communicate the point of novelty to the Examiner.

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<sup>1</sup> *Ex parte Jepson*, 1917 C.D. 62, 243 O.G. 525

The specification at paragraph [0019] discusses the advantages of the invention, one of these advantages being the use of the trans form of ED-71 as a material for the synthesis of various types of Vitamin D compounds. Since this is an advantage of the invention, it is clearly an improvement over previous methods of synthesizing Vitamin D compounds.

**II. Claims 12 and 13 are definite.**

The term "generation" in claim 12 means formation or production. That is, in the presently claimed invention, as described at paragraph [0014], the generation of degradation products, namely, tachysterol and trans ED-71, is suppressed. That is, in the formation of this degradation product during storage of the active ingredient is suppressed.

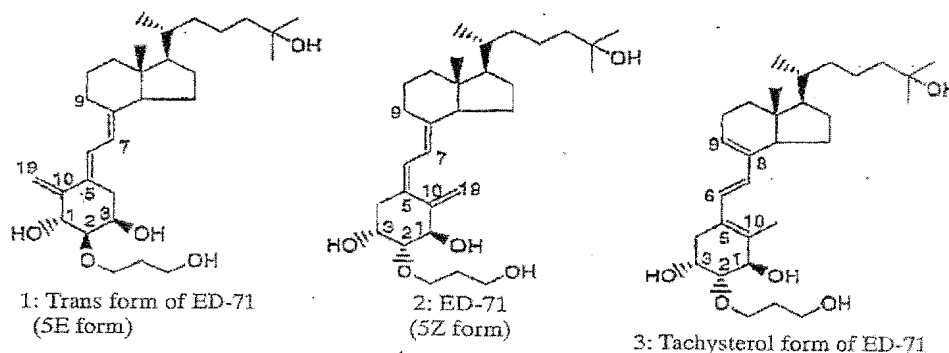
"Shading," that is, "under shading" in claim 13, means that the composition is stored in the absence of light, *i.e.*, under shade.

The "improvement" in claim 18 is that, in a standard method for synthesizing Vitamin D compounds, the intermediate compound used in the synthesis is (5E,7E)-(1R,2R,3R)-2-(3-hydroxypropoxy)-9,10-secocholesta-5,7,10(19)-triene-1,3,25-triol.

**III. Claims 10, 14, 17 and 18 are not anticipated by Yamauchi, US 6,448,421.**

(5Z,7E)-(1R,2R,3R)-2-(3-hydroxypropoxy)-9,10-secocholesta-5,7,10(19)-triene-1,3,25-triol, ED-71, can decompose to 6E-(1R,2R,3R)-2-(3-hydroxypropoxy)-9,10-secocholesta-5,7,10 (19)-triene-1,3,25-triol, the tachysterol of ED-71 and/or to o(5E,7E)-(1R,2R,3R)-2-(3-hydroxypropoxy)-9,10-secocholesta-5,7,10 (19)-triene-1,3,25-triol, the trans form of ED-71.

These compounds and their chemical structure are shown in the present specification, for example, at paragraphs [0007]-[0011] and [0028]-[0032]. Their chemical formulas are provided below:



As can readily be seen from the chemical formulae, these compounds differ in the configuration at the 5-position or in the location of existing double bonds. Furthermore, these compounds actually exist as separate compounds. For example, each of the compounds can be separated from the other by, for example, chromatography, as shown in Figures 1 and 2 of the present specification.

Yamauchi discloses preparation and purification of ED-71. In contrast thereto, the present claims are directed only to the trans form of ED-71, that is, the 5Z-form. Claim 10 is drawn to a composition containing the trans form of ED-71, and claims 12 and 13 are drawn to a method for suppressing the formation of the trans form. In claim 14, the trans form is used as a standard for the degradation product. Claim 17 and 18 are directed to methods of synthesizing Vitamin D compounds using the trans form as an intermediate.

As has been discussed at length in the prosecution of these claims, the trans form of ED-71 is a completely different compound from ED-71 itself.

It is believed that the Examiner understands that either of (5Z,7E)-(1R,2R,3R)-2-(3-hydroxypropoxy)-9,10-secocholesta-5,7,10 (19)-triene-1,3,25-triol or of (5E,7E)-(1R,2R,3R)-2-(3-hydroxypropoxy)-9,10-secocholesta-5,7,10 (19)-triene-1,3,25-triol recited in the claims is the tachy form of ED-71. This is because the Examiner refers to tachysterol of formula III disclosed in Yamauchi, which she alleges anticipates the claimed invention. However, neither of these two compounds is the tachy form of ED-71. Correctly, (5Z,7E)-(1R,2R,3R)-2-(3-hydroxypropoxy)-9,10-secocholesta-5,7,10 (19)-triene-1,3,25-triol is ED-71 and (5E,7E)-(1R,2R,3R)-2-(3-hydroxypropoxy)-9,10-secocholesta-5,7,10 (19)-triene-1,3,25-triol is the trans form of ED-71.

Thus, Yamauchi does not anticipate the herein claimed invention, as Yamauchi does not disclose a method for suppressing the formation of a degradation product of ED-71.

In *Sanofi-Synthelabo, Sanofi-Synthelabo Inc. v. Apotex, Inc.*, 550 F.3d 1075; 89 USPQ2d 1370 (Federal Circuit 2008), the court held that the district court was correct in its holding that the dextrorotatory isomer was patentable in view of its known racemate described in earlier patents. As in the present case, the new isomer has different properties from the known compound. Therefore, it is respectfully submitted that the trans form of ED-71 is patentable over ED-71.

**IV. Claims 10, 14, 17 and 18 are not anticipated by Miyamoto, Chem. Pharm. Bull., and Miyamoto et al., US 4,666,634.**

The Examiner alleges that because the references disclose a method for producing ED-71 they inherently disclose the presently claimed invention.

This rejection is respectfully traversed.

Miyamoto discloses Vitamin D analogues that have a hydroxy group at the 2-position. The presently claimed invention relates to stabilizing preparation containing ED-71 as well as standards for assaying for degradation products of ED-71. The trans form of ED-71, which is the most significant degradation product, can be used both in the analysis of an ED-71 preparation to gauge its stability, and as a material for synthesizing various types of Vitamin D-based compounds.

The trans form of ED-71 and the tachysterol form of ED-71 are not the same compounds disclosed by Miyamoto, and it is not understood how the Examiner can allege that Miyamoto anticipates the herein claimed invention. As noted above, a compound can be patentable over a known isomer of the compound.

**V. Claims 10, 14, 17 and 18 are not anticipated by Miyamoto, Chem. Pharm. Bull., and Miyamoto et al., US 4,666,634.**

The Examiner alleges that because the references disclose a method for producing ED-71 they inherently disclose the presently claimed invention.

Miyamoto discloses Vitamin D analogues that have a hydroxy group at the 2-position. The presently claimed invention relates to stabilizing preparation containing ED-71 as well as standards for assaying for degradation products of ED-71. The trans form of ED-71, which is the most significant degradation product, can be used both in the analysis of an ED-71 preparation to gauge its stability, and as a material for synthesizing various types of Vitamin D-based compounds (page 6, paragraph [0019]).

The trans form of ED-71 and the tachysterol form of ED-71 are not the same compounds disclosed by Miyamoto, and it is not understood how the Examiner can allege that Miyamoto anticipates the herein claimed invention. As noted above, a compound can be patentable over a known isomer of the compound.

**VI. Claims 10, 12, 14, 17 and 18 are not unpatentable over Yamauchi, Miyamoto Chem. Pharm. Bull., Miyamoto '634 and Chen, WO 03/047595.**

As noted above, neither Yamauchi nor Miyamoto discloses the trans form of ED-71.

The Examiner has cited column 19, lines 35-41, as teaching the products. It appears that column 19, lines 45-50, is the passage that is relevant, which passage states that the tachy and lumi forms and the pro-form of ED-71 are useful for a test or analysis which may be carried out in the synthesis of a Vitamin D derivative. However, this says nothing at all about measuring degradation of ED-71 during storage, nor of the trans form itself.

Chen states at paragraph [0056], "The pharmaceutical compositions of the present invention may further comprise one or more additives. Additives that are well known in the art include, e.g., antioxidants, ..." However, it was general technical knowledge at the time of completion of the present invention that antioxidants are added to suppress generation of oxides, that is, to prevent oxidation of compounds in a system. Thus, one skilled in the art reading Chen would assume that the antioxidants were added to prevent oxidation of Vitamin D compounds.

Miyamoto only discloses compounds of the 5Z form, and Miyamoto fails to disclose any compounds of the 5E form, as claimed herein.

In contrast thereto, the decomposition products to be suppressed in the presently claimed compositions are not oxidation products, the formation of which would be suppressed by antioxidants, but are the trans form of ED-71 and the tachysterol form of ED-71. These decomposition products are not oxides of ED-71, but are isoforms of ED-71. These decomposition products have neither an increased number of oxygen atoms nor a reduced number of hydrogen atoms, which would be the result of oxidation of ED-71. However, it has been demonstrated that dl- $\alpha$ -tocopherol is far superior to other antioxidants in suppressing summarization of ED-71.

In the supplemental remarks filed March 26, 2008, the Declaration of Hitoshi SATO, one of the inventors of the present application, was submitted. In this declaration, Mr. SATO

provided evidence showing that the trans form of ED-71 exhibited a relative differentiation-inducing activity of HL-60 cells that was nearly 20 times greater than the parent compounds, ED-71. It is clear from this declaration that the trans form of ED-71 is not obvious over the parent compounds.

In responding to the remarks made in the amendment filed October 14, 2009, the Examiner alleged that both 5E,7E and 5Z,7E are known, citing W02005/074943. However, this publication is based on the same priority document as the present application, and one would expect it have all of the same information as in the present specification. Because this publication is based upon the same priority document as the present application, it is respectfully submitted that this publication cannot serve as evidence that the trans form of ED-71 was known.

With respect to the difference between ED-71 and the trans form of ED-71, it is not required that the specification provide evidence of the differences. That is exactly why the declaration of Hisakazu KATSUKI was submitted with the amendment filed August 20, 2009. That declaration demonstrated that that these two compounds have greatly different properties in differentiation. This is all that is required by the *Sanofi* decision cited above to differentiate the trans form of ED-71 from ED-71.



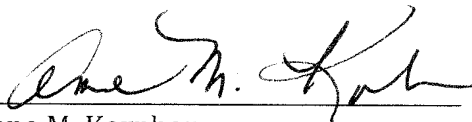
## CONCLUSION

Appellants believe and respectfully submit that the Examiner's rejections are without merit for the reasons pointed out above, unreasonable, that no anticipation has been established and that no *prima facie* case of obviousness has been established and that the Examiner has not met this burden. Appellants further respectfully submit that the claims are definite and fully enabled by the specification and the written description.

These rejections should be reversed and such is respectfully prayed.

Respectfully submitted,

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## CLAIMS APPENDIX

10. A composition comprising a standard degradation product for analysis of a sample containing (5Z,7E)-(1R,2R,3R)-2-(3-hydroxypropoxy)-9,10-secocholesta-5,7,10(19)-triene-1,3,25-triol, said composition containing as the standard degradation product (5E,7E)-(1R,2R,3R)-2-(3-hydroxypropoxy)-9,10-secocholesta-5,7,10(19)-triene-1,3,25-triol.

12. A method of suppressing the generation of a degradation product in an oily preparation comprising (5Z,7E)-(1R,2R,3R)-2-(3-hydroxypropoxy)-9,10-secocholesta-5,7,10(19)-triene-1,3,25-triol, comprising adding dl- $\alpha$ -tocopherol to the preparation, wherein the degradation product is (5E,7E)-(1R,2R,3R)-2-(3-hydroxypropoxy)-9,10-secocholesta-5,7,10(19)-triene-1,3,25-triol.

13. The method of Claim 12, wherein the amount of (5E,7E)-(1R,2R,3R)-2-(3-hydroxypropoxy)-9,10-secocholesta-5,7,10(19)-triene-1,3,25-triol generated in the preparation after 12-month storage at room temperature under shading is suppressed to 1% or less.

14. The compound according to Claim 10, which is used as a standard of a degradation product in analysis of a preparation comprising (5Z,7E)-(1R,2R,3R)-2-(3-hydroxypropoxy)-9,10-secocholesta-5,7,10(19)-triene-1,3,25-triol.

17. A compound of (5E,7E)-(1R,2R,3R)-2-(3-hydroxypropoxy)-9,10-secocholesta-5,7,10(19)-triene-1,3,25-triol, for synthesizing Vitamin D compounds.

18. In a method for synthesizing a Vitamin D compound comprising reacting an intermediate compound,

the improvement wherein the intermediate compound is (5E,7E)-  
(1R,2R,3R)-2-(3-hydroxypropoxy)-9,10-secocholesta-5,7,10(19)-triene-1,3,25-triol.

19. A composition comprising a standard degradation product for  
analysis of a sample containing (5Z,7E)-(1R,2R,3R)-2-(3-hydroxypropoxy)-9,10-  
secocholesta-5,7,10(19)-triene-1,3,25-triol, said composition consisting of, as a standard  
degradation product, (5E,7E)-(1R,2R,3R)-2-(3-hydroxypropoxy)-9,10-secocholesta-  
5,7,10(19)-triene-1,3,25-triol.

**EVIDENCE APPENDIX**

The attached Declaration Under 37 C.F.R. §1.132 of independent expert Hioshi SAITO, was filed on March 26, 2008, in the U.S. Patent and Trademark Office in Application No. 10/588,609.

The Supplemental Remarks were filed supplemental to the amendment of March 8, 2008, the latter in reply to the non-final Office Action mailed January 8, 2008, and therefore should have been entered as a matter of right as it was filed before the issuance of the Final Action of December 29, 2009. Such Declaration is not referred to at all in the Final Rejection of December 29, 2009.

**RELATED PROCEEDINGS APPENDIX**

There are no related proceedings in connection with the subject application.